Name:_____ Date:_____

Algebra 2/Trig: Double Angle Formulas

DO NOW: (Review) The expression $\tan(x+y)$ is undefined when…

(1) $\tan x \tan y = 0$ (3) $\tan x \tan y = -1$

(2) $\tan x \tan y = 1$ (4) $\tan x + \tan y = 0$

A] Double Angle Trig Formulas

$\sin 2A = 2\sin A \cos A$

$\cos 2A = \cos^2 A - \sin^2 A$

$\cos 2A = 2\cos^2 A - 1$

$\cos 2A = 1 - 2\sin^2 A$

$\tan 2A = \dfrac{2\tan A}{1-\tan^2 A}$

Please give all answers as **exact values in simplest form**.

1) If $\cos A = \dfrac{5}{13}$, and $\angle A$ terminates in Quadrant I, find each of the following:

a] $\sin 2A$

b] $\tan 2A$

2) If $\tan A = -\frac{4}{3}$, and $\angle A$ resides in Quadrant II, find each of the following:

a] $\sin 2A$

b] $\cos 2A$

c] $\tan 2A$

d] In which quadrant does $2A$ reside?

3) If $\cos\theta = -0.6$, and θ resides in Quadrant III, find each of the following:

a] $\sin 2\theta$

b] $\cos 2\theta$

c] $\tan 2\theta$

d] In which quadrant does 2θ reside?

4) If $\sin\theta$ is negative and $\sin 2\theta$ is positive, then $\cos\theta$

(1) must be positive

(2) must be negative

(3) must be 0

(4) may be positive or negative

5) If $\sin A = -0.8$, what is the value of $\cos 2A$?

6) If $\tan A = \frac{1}{4}$, what is the value of $\tan 2A$?

7) If $\cos A = -\frac{24}{25}$, and $\angle A$ resides in Quadrant III, find each of the following:

a] $\sin 2A$

b] $\cos 2A$

c] $\tan 2A$

d] In which quadrant does $2A$ reside?

8) If $\cos A = \frac{1}{3}$, and $\angle A$ resides in Quadrant I, find each of the following:

a] $\sin 2A$

b] $\cos 2A$

c] $\tan 2A$

d] In which quadrant does $2A$ reside?

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Algebra 2/Trig: Half Angle Formulas

DO NOW: (Review) Express in simplest radical form:

a] $\sqrt{-72x^5y^{11}z^{34}}$ b] $\sqrt[3]{-54a^3b^4c^5d^{92}}$

A] Half Angle Trig Formulas:

$$\sin\frac{1}{2}A=\pm\sqrt{\frac{1-\cos A}{2}} \qquad \cos\frac{1}{2}A=\pm\sqrt{\frac{1+\cos A}{2}} \qquad \tan\frac{1}{2}A=\pm\sqrt{\frac{1-\cos A}{1+\cos A}}$$

Please give all answers as **exact values in simplest form**.

1) If $\cos A=\frac{7}{25}$ and $\angle A$ is a positive acute angle, find each of the following:

a] $\sin\frac{1}{2}A$ b] $\cos\frac{1}{2}A$ c] $\tan\frac{1}{2}A$

2) If $\cos B = \frac{5}{9}$ and $\angle B$ is a positive acute angle, find each of the following:

a] $\sin\frac{1}{2}B$ b] $\cos\frac{1}{2}B$ c] $\tan\frac{1}{2}B$

3) If $\sin\theta = 0.6$ and $\angle A$ is a positive acute angle, find each of the following:

a] $\sin\frac{1}{2}\theta$ b] $\cos\frac{1}{2}\theta$ c] $\tan\frac{1}{2}\theta$

4) Find $\tan\frac{1}{2}x$ if $\sin x = \frac{5}{13}$ and $90° < x < 180°$.

5) Find $\cos\frac{1}{2}x$ if $\cos x = .28$ and $270° < x < 360°$.

6) If $\cos A = \frac{8}{17}$ and $\angle A$ is a positive acute angle, find each of the following:

a] $\sin\frac{1}{2}A$ b] $\cos\frac{1}{2}A$ c] $\tan\frac{1}{2}A$

7) The expression $\sqrt{\frac{1-\cos 80°}{2}}$ is equivalent to

(1) $\cos 40°$ (2) $\sin 40°$ (3) $\cos 160°$ (4) $\sin 160°$